# Northern Virginia Community College: DCO Tech Evaluation Baseline Interview Summary

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# INTRODUCTION

With funding from the National Science Foundation's Advanced Technologies in Education (NSF-ATE) program, Northern Virginia Community College (NOVA) developed the Data Center Operations and Engineering Technicians Outreach and Development (DCO Tech) project to improve the pipeline of students prepared to enter the workforce as technicians for engineering technology (ET), which includes data center operations (DCO). To achieve this goal, the DCO Tech project will provide 1) an ET summer bridge program for high school students, 2) an internship preparatory program for ET students, 3) an externship for secondary teachers and administrators to develop knowledge of ET, 4) an externship for industry professionals to engage in ET education, and 5) a veteran outreach program to inform veterans of careers in ET. Additionally, the DCO Tech project aims to increase collaboration between secondary and postsecondary institutions and industry.

In February 2022, Magnolia evaluators conducted 30–45-minute baseline interviews through Zoom with industry and K-12 staff representatives from the Northern Virginia region. The interviews included four industry[1] representatives whose roles focus on operations of data centers, community engagement or impact, academic relations, human resources, and data center owners and operators. The interviews also included four K-12 staff representatives whose roles generally involve overseeing Career and Technical Education (CTE) and engineering programs to provide support with, for example, professional development, software and equipment, industry certifications, curriculum, industry trends, and community engagement.

The purpose of these interviews was to better understand participants' a) awareness of ET career pathways, including careers in the advanced manufacturing and data center industries; b) roles in fostering and supporting the ET pathways; and c) ideas for improving ET pathways. This summary details the findings from these interviews, including descriptions of the employment need, the ET career pathways, and partnerships in the region. Lastly, it presents a summary and associated recommendations to improve DCO Tech project implementation moving forward.

# REGIONAL EMPLOYMENT NEED

> *"There're just not enough qualified people to keep up with the market saturation. That's just the bottom line."*
>
> —Industry representative

All industry representatives shared that there is a shortage of employees for advanced manufacturing and/or data center industries in the NOVA region with some sharing that it is an industry-wide problem. Several of these representatives described three primary reasons for these staff shortages: retention challenges (e.g., around a 10% employee attrition annually), retirement, and substantial industry growth (e.g., new facilities) where the industry is growing faster than they can train employees to fill the positions. All industry representatives expected this employment need to continue to grow over the next five years with some estimating the need will double or there will be a shortfall of 300,000 positions during this time.

[1] One interview included four representatives from the same organization.

Industry representatives described the essential skills of new hires in their industry. Most representatives shared that they look for new talent who have a combination of technical aptitude along with professional skills. The specific technical skills required can vary by position and the professional skills included a mission critical mindset, communication skills, and dependability. Given the shortage of employees, several representatives explained that new hires often have minimal skills and experience. These representatives noted several challenges to finding talent and shared potential strategies to address them (Table 1).

> *"We couldn't have dreamed, even 5 to 10 years ago that we would be looking at attitude and aptitude being our core basis and building from there."*
>
> —Industry representative

*Table 1. Identified Challenges and Solutions to Hiring Talent from Interviews*

| Description of Challenges | | Potential solutions |
|---|---|---|
| Lack of awareness of available career paths in advanced manufacturing and data center operations | *"We have a tremendous number of students who are very well educated, ready to get work…almost none of whom recognize that these large data centers in their backyard… have a shortfall of workers."* —Industry representative | Marketing and sharing the opportunities and benefits of these careers (e.g., careers, shorter pathways) as early as possible to students (e.g., middle schools), and also to counselors, teachers and parents |
| Lack of volume (e.g., few graduates) to provide enough qualified talent | *"I think what it boils down for us is talent volume."* —Industry representative | Offer more programs (e.g., teach professional skills, certifications, apprenticeships) and pathways (e.g., starting in high school); increase NOVA's program capacity; address qualified teacher shortages (e.g., credentialing faculty; make teaching more lucrative); and hire from adjacent industries with similar skillsets. |
| Industry competition for talent | *"These companies are fighting over…the students coming out of the program."* —Industry representative | Enhance collaboration between education and industry and across companies at the regional and state level to emphasis workforce development, meet industry needs, and spread the word about careers. |

## K–12 REPRESENTATIVES KNOWLEDGE OF ET PATHWAYS

To examine K–12 representatives' levels of awareness of pathways for students to purse ET pathways, evaluators asked about what they knew regarding the data center presence and degree pathways for students to pursue ET careers.

> *"I'm hearing loud and clear that a lot of the data centers have a need for workforce development there. There is a lot of outreach from [NOVA] and the data center coalition and we're hearing that loud and clear."*
>
> —K–12 representative

K–12 representatives knew about either the advanced manufacturing or the data center presence in northern Virginia, or both. For example, two representatives described the high demand for employees in the data centers. The K–12 representatives shared different employment needs for advanced manufacturing for their specific locale. One representative felt that there is a huge demand for employees, while three representatives shared that there is not much demand for employees in their location. One representative could not share information about the data centers in their area.

When asked about their awareness of postsecondary programs, K–12 representatives were less knowledgeable about the available degree programs for advanced manufacturing, data centers, or both, in northern Virginia (e.g., some representatives primarily described their own programming or courses). One representative described NOVA's new DCO specialization, and

another shared that the ET pathway is a priority for NOVA which is looking to the K–12 districts to expand awareness and readiness for these pathways. Additionally, three K–12 representatives described that there are regional opportunities for students which do not require a credential from a 4-year institution. For example, there are many opportunities for apprenticeship programs, especially in the trades and hospitality fields.

K–12 representatives shared the types of information or resources that would help them better understand the available careers and programs for students in the advanced manufacturing and data center industries. These included:

- more industry connections (e.g., need for information about local business and internships opportunities),
- more information for teachers (e.g., required credentials, business tours, teacher externships, what it is like working in a data center),
- information about the NOVA programs once they are finalized (e.g., the content, types of intended students), and
- the types of courses which would best prepare students to enter NOVA's ET pathway.

> *"I've been trying to find that information…if there are businesses that, you know, want to reach out, we're open to listening and sharing the information and meeting with them... But like I said, nobody has really reached out to us so I mean, definitely the business connection will definitely help..."*
> —K–12 representative

## K–12 STUDENT AWARENESS AND INTEREST

Evaluators also asked about K –12 representatives' perceptions of students' awareness and interest in pursuing ET degrees and careers. Most K –12 representatives indicated student awareness of the advanced manufacturing and data center presence in northern Virginia and its careers and degree programs was low. They shared reasons for this lack of awareness, including misconceptions of modern manufacturing, competing demands for students' attention, and a lack of K–12 teacher and parent awareness. One representative shared that the students in their district may have heard about data centers, but it is a relatively new term so they may not have a deep understanding of what they entail.

> I don't think students really know very much about it because I don't think the adults know a lot about it."
> —K–12 representative

The representatives shared the following strategies to improve student awareness: providing career exploration opportunities (e.g., videos, field trips, apprenticeships and internships), ensuring students can secure employment after program graduation, and changing misconceptions (e.g., a 4-year degree or specific skillset is not required for employment and how advanced manufacturing has changed). It is also helpful to make students aware of the skillsets, pathways to employment opportunities, potential salaries, and to start sharing this information as early as possible. Additionally, K–12 representatives discussed increasing awareness with all stakeholder groups, for example, reaching parents and connecting with educators (e.g., teachers, counselors, and staff).

K–12 representatives confirmed that student interest in other Information and Engineering Technology (IET) disciplines is very high, notably for cloud computing, computer science, cybersecurity and game design. One representative added:

> *Sometimes people sell themselves short in the [IET] field; like I think it's intimidating to some of our students. But if they would just get in there and try it, you know, they might find that they're good at a particular niche that they had no idea that they would be good at.*

Representatives were divided about whether students show a similar level of interest in ET and DCO as compared to other IET disciplines. More specifically, two representatives shared that interest in ET and DCO is also high, and two representatives indicated that there is less student interest, potentially because students and teachers may be confused about whether it is engineering or technology, lack of awareness of the field, or there is a need promote these careers more effectively.

> "I think if you put STEM on it in [our county], you're going to have a high interest."
>
> —K–12 representative

## DIVERSITY IN THE ET WORKFORCE

Industry representatives broadly described the demographics of the population of technicians at their organizations. Two representatives described a wide range of ages for their technicians and two described a high number of veterans. In general, most industry representatives described higher diversity in terms of race and ethnicity than gender.

> "Showing them people that look like them, act like them, have similar backgrounds that are successful in these fields. That's been a huge thing as students want to see themselves, you know, in the area."
>
> —K–12 representative

Several representatives noted a need for more diversity, especially more gender diversity, and explained that a lack of awareness of these careers or cultural barriers can hinder efforts to increase diversity. One representative shared that their organization is evenly split between males and females, and white and nonwhite technicians.

Industry representatives then shared strategies that would help create a more diverse population of technicians, including community education, events and outreach, and ensuring employee diversity is represented to the community (i.e., community members need to see employees with characteristics similar to their own). Additionally, some representatives shared that it is important to use these types of strategies with younger students to increase diversity in the pipeline earlier.

> "I think we have access to one of the most diverse student populations because of the community college and their constituent population. But it's still primarily male. And then that's where I think probably the biggest challenge is. We're seeing a lot more diversity from other aspects that you'd consider as you evaluate the diversity of the workforce."
>
> —Industry representative

The K–12 representatives also shared the strategies to attract underrepresented students to ET career pathways, which included the following: reaching these students earlier in their education pathway and having business and community partnerships with similar diversity goals. One representative described the importance of looking at the data "as to who applies and who gets into the academies..." and provided an example of how they are considering if the required grade point averages for dual enrollment classes are a barrier to English Language learners. These representatives also described the importance of providing representation of industry diversity for students.

# ENGINEERING TECHNOLOGY CAREER PATHWAYS

K–12 representatives described the programs their district offers that might be aligned with ET career pathways. These programs included:

- academy programs (e.g., STEM, manufacturing practices and materials, and mechatronics),
- technology and engineering pathways (e.g., robotics, aerospace, and cybersecurity),
- specific courses (e.g., manufacturing, engineering studies, information technology, foundational engineering explorations, engineering systems), and
- camps (e.g., health and medical science, career explorations and STEM).

Some representatives noted that their pathways often start with foundational engineering principles as early as middle school. During the interviews, several challenges to developing these pathways emerged, including a lengthy process to approve new K–12 programs and pathways, limited student capacity for the Academies and CTE, expensive equipment and a lack of faculty who have the credentials and educational background to teach these courses, especially for dual enrollment.

K–12 representatives also described effective approaches for community colleges to establish a connection or pathway with these programs. These included taking the time to identify the decision-makers in the school districts (which can be challenging), bringing everyone to the table for discussions, attending regional meetings (e.g., during the Virginia Association of CTE Administrators [VACTEA]), and understanding what is happening at the county level (not just regionally). One representative also noted that community colleges should provide a better overview of the available programs and support secondary schools by, for example, being a part of the discussion or as schools align their dual enrollment opportunities.

> "So sometimes it might take community colleges some time to figure out who's the true decision maker.
> —K–12 representative

## INDUSTRY REPRESENTATIVES' KNOWLEDGE OF ET PATHWAYS

To examine industry representatives' levels of knowledge about ET pathways, evaluators asked about what they knew regarding secondary or higher education efforts to create degree programs and pathways in advanced manufacturing and/or data center operations. Representatives had varied levels of knowledge of secondary and postsecondary programs. Two representatives were aware of bridge programs, high schools desire for dual enrollment courses, and efforts to help better align high school courses with the postsecondary curricula. Two representatives shared knowledge about postsecondary programs, specifically at NOVA. One representative shared that they have limited awareness of high school or college programs in data center operations.

> "It's generally not a formal education type of gig. It's generally more experiential facilities type personnel."
> —Industry representative

Additionally, industry representatives shared that the pathways technicians typically take before entering their industries are usually from a variety of educational pathways (e.g., Mechatronics or aviation certifications or AAS degrees) or other industries (e.g., diesel mechanic, telecoms, mechanical electrical, military, and other trades). Most of these representatives also shared the following credentials these technicians may have, as examples:

- Occupational Safety and Health Administration (OSHA),
- BICSI certifications,
- Certified Mission Critical Operator,

- and Certified Data Center Operator.

One representative shared that credentials are generally not required for employment. This individual felt this to be a detriment of the industry, which would benefit from standard credentials to ensure new hires have similar baseline knowledge.

Further, given the variety in employees' background knowledge and skills, all four industry representatives shared that on-the-job training is required. Most of these representatives described their training programs (e.g., centralized operations training program, rigorous and hands-on training with supervision, tiered qualification system) and training with a mentor or partner.

K–12 representatives described the following ways their districts support students who are pursuing technician career pathways including

- providing work-based learning (WBL) experiences,
- offering industry certifications,
- providing professional development so teachers can better reach and support students in these fields,
- investing and evaluating their CTE programs, and
- trying to change the narrative to show multiple career pathways besides a 4-year degree through school career coaches and counselors.

> "I think that one thing that we're trying to do with our school career coaches, especially in counselors in our department, is to bust that myth that a 4-year degree is the only way to be successful."
>
> —K–12 representative

These representatives also described other ways they would like to provide support for these students, including offering more industry certifications that are relevant to employers and feasible for students to obtain, and finding externships and internships that align with their programs.

# PARTNERING WITH KEY STAKEHOLDERS

One component of the DCO Tech project is to increase collaboration between secondary and postsecondary institutions, and industry. To support this effort, evaluators asked representatives to described the ways they currently partner with other regional stakeholders involved in ET career pathways and their partnership as a part of the DCO Tech project.

> "But there's definitely a desire for collaboration and there's a lot of collaboration on many different levels."
>
> —Industry representative

All industry representatives shared they partner with trade associations (e.g., the Data Center Coalition, Northern Virginia Technology Council, AFCOM). One representative added that there is a need for more industry collaboration to share experiences and ideas, invest in workforce development and NOVA's efforts, and to collectively provide resources (e.g., funding for additional faculty). Two of these representatives also noted partnerships with secondary institutions, for example, through career fairs to share opportunities with students, staff and families, tours for JROTC students, or by serving on the CTE state advisory committee. All industry representatives noted they have current partnerships with postsecondary institutions (e.g., NOVA, 4-year institutions).

Most K–12 representatives partner with state or local level government (e.g., planning and zoning agency) for example, to establish externship opportunities or build a network by sharing resources and information. Two of these representatives shared that they partner with industry (e.g., engineering, cybersecurity and trade companies) who serve on a CTE advisory committee or provide classroom presentations. Two representatives shared that there is a desire to partner more with industry. Some of these representatives also shared that they partner with other educational institutions or associations (e.g., VACTEA, universities, and youth services).

> "I think that there's always been a partnership, but it hasn't been as effective as it could be. And we're running out of time… I think it's really important that we work together."
>
> —K–12 representative

## DCO TECH PROJECT INVOLVEMENT

Representatives then described their organizations' roles in the DCO Tech project, how their organizations can contribute to and benefit from the project, and how the project could foster partner involvement and engagement.

> "I see us as a true partner with Nova in this regard, super excited about it.
>
> —K–12 representative

Broadly speaking, some representatives shared that their role is to be at the table. They also explained how they plan to be involved in the project. Two representatives shared they are not fully sure what their organizations' role will be yet. More specifically, many of the ways these representatives described their specific roles aligned with how they could contribute to the success of the DCO Tech project, which included the following ways:

- Providing program advocacy and industry advising (industry)
- Hosting events (e.g., school outreach, class trips, site visits and tours; industry)
- Providing internship and career preparation opportunities (industry)
- Offering mentoring programs (industry)
- Offering financial support (e.g., Scholarships; industry)
- Providing students for the programs (K–12)
- Sharing information (e.g., with teachers; K–12)
- Providing externs for the industry or K–12 externships (both industry and K–12)

> "To me, the benefits are exactly the same as the opportunities..."
>
> —Industry representative

Next, representatives shared how their organizations could benefit from the DCO Tech project. Based on the interviews, the industry partners could benefit from more skilled and diverse talent in the industry. K-12 organizations could benefit from more opportunities for students (e.g., internships, apprenticeships and job placements) in a growing industry and training for teachers (e.g., who need more credentials to be able to teach dual enrollment classes). Some representatives shared that they see DCO Tech as a mutually beneficial project or a benefit for the community.

Representatives discussed how the DCO Tech project team can foster partner involvement and engagement in the project. One industry representative shared several ways in which NOVA is fostering partnerships well, including information sharing, constant communication about opportunities, and marketing (e.g., flyers).

However, there are still areas where the DCO Tech project can better foster industry partnerships. For example, the DCO Tech project can help industry more effectively work within the structure of the community college (e.g., helping industry know who to contact at NOVA), provide more support for industry members who are involved in the project (e.g., providing a clear onboarding process and curriculum for externs) and develop an industry engagement model. These representatives shared that the DCO Tech project can most effectively communicate with industry partners by contacting organizations individually and not through an email blast and improving the messaging they are communicating with their partners (e.g., elevator pitches, brand recognition, expectations for externships). The DCO Tech project can foster K–12 partnerships by attending regional meetings or local events (e.g., career and internship fairs, or association meetings) to be more visible and communicate directly with teachers and students, offer interesting opportunities, and understand teachers scheduling (e.g., summer conflicts).

> "And what's your order of priority in terms of those [goals]? Because you leave it up to the companies to self-select, sometimes you don't get a choice made... So, I like prioritizing, I like setting goals…"
>
> -Industry representative

# SUMMARY & RECOMMENDATIONS

This section summarizes the baseline interview data and shares recommendations to support implementation of the DCO Tech project moving forward. Based on feedback from the four representatives interviewed, the responses showed that there is a shortage of employees for advanced manufacturing and data center industries in the NOVA region, a need which is expected to grow over the next five years. Given this shortage, employers typically hire employees who often have limited skills and experience. Instead, they look for new talent who have a combination of technical aptitude with professional skills and then provide on-the-job-training to develop their job-specific skills.

Representatives shared several key challenges and potential solutions to addressing this employee shortage. K–12 representatives knew about the industry presence and careers in northern Virginia but were less knowledgeable about the related degree programs. These representatives generally described a low level of student awareness and mixed student interest in these areas. Though these industries are becoming more diverse, there is still room for growth, especially for gender diversity. Representatives shared several strategies for increasing diversity in industry and at the K–12 level.

Districts in the region offer programs that align with the ET career pathways, including academy programs, technology and engineering pathways, coursework, and camps. However, several challenges (e.g., limited student capacity, lack of credentialed faculty) impede the development of these pathways. Most industry representatives had some knowledge of these secondary or higher education efforts to create degree programs and pathways in their industries. However, the pathways technicians typically take before they enter these industries take a nontraditional route where technicians usually come from other educational pathways or other industries and trades and then are trained on the job.

Representatives described partnerships with industry (e.g., industry trade associations, companies), state or local level government, secondary institutions (e.g., CTE committees) and postsecondary institutions (e.g., NOVA). The representatives plan to contribute to the DCO Tech

project through a variety of ways and anticipate benefiting from the project as well. Representatives also discussed how the DCO Tech project team can foster partner involvement and engagement in the project and most effectively communicate with their partners.

## RECOMMENDATIONS

Based on interviews, this section lists several recommendations that could help the project activities moving forward. This list does not include all recommendations or strategies that surfaced during the interview because some of these suggestions were not ones that team could address within the scope of the project. Moreover, these recommendations are offered for the project team's consideration because not all of them may not be possible to implement.

### *With respect to ET education*

- Provide K–12 partners with the following types of information and resources: information about local business who are willing to connect with schools and offer internships, information about the DCO Tech activities once all the programs are finalized, and the types of courses which would better prepare students to enter NOVA's ET pathway.
- Consider the following strategies to improve K–12 student awareness of ET pathways: provide career exploration opportunities and information about skillsets, pathways to employment opportunities, opportunities and benefits of the careers (e.g., potential salaries), and ideas to change students' misconceptions about ET career pathways. Provide this information as early as possible to students, parents, and educators.
- Consider the following approaches when connecting with K–12 programs and pathways: take the time to identify the decision-makers in the school districts, ensure everyone is at the table for discussions, attend regional meetings, have a better understanding what is happening at the county level (not just regionally), provide a better overview of the available programs, and better support secondary schools to align their dual enrollment opportunities.
- The DCO Tech project can foster K–12 partnerships by attending events (e.g., career and internship fairs, or student associations) to be more visible and communicate directly with teachers and students, be sure to offer interesting opportunities, and understand teachers scheduling (e.g., summer conflicts).

### *With respect to ET careers*

- Ensure ET students have technical aptitude and especially professional skills since this is what the industry is currently looking for in new hires and is sometimes lacking in new hires. The DCO Tech internship preparation program is a way to ensure these professional skills (e.g., communication skills, dependability, etc.).
- Help industry partners more effectively work within the structure of the community college, for example, ensuring they know who to contact or have a dedicated person or team who is up to speed on the project and NOVA's systems.
- Consider developing an engagement model with different points of entry to show how partners can be involved.
- Consider the following strategies to help diversify the pipeline of technicians: community education, events and outreach, representation of diverse technicians to the community, reaching underrepresented students earlier in their education, and using data to reduce barriers and increase access to ET pathways for all students.

***With respect to DCO Tech project activities***

- Reach out to all partners to ensure they all understand their organization's role on the DCO Tech project.
- Provide more support for industry members who are involved in the DCO Tech project, for example, ensure there is a clear onboarding process and provide support with implementation (e.g., handing them a completed curriculum, providing clear expectations, sitting through an example class) to ensure they feel confident teaching.
- During the externships, consider including information and resources about credentialing to ensure industry and K–12 staff understand what is required to be able to teach ET and dual enrollment courses, which may help address teacher shortages. Also consider sharing more information about the available degree programs because K-12 representatives were less knowledgeable about what degree programs are available.
- Find ways to accommodate K–12 externs' schedules when they have conflicting district commitments (e.g., any ways to have externs fulfill district and grant requirements simultaneously).
- Consider the following suggestions to improve DCO Tech project messaging, including the following:
    - Develop elevator pitches (e.g., for internships)
    - Prioritize the goals of the project (e.g., what are the biggest areas that have the best return on investment) and focus on these activities until the next phase to ensure the ask for industries is very clear
    - Include three key selling points for industry partners (a robust labor pool, ability to be of service and brand recognition with NOVA).
- Consider the following suggestions when sharing information and requests:
    - Include the types of information the intended audience would want to know (e.g., time commitment, expectations).
    - Put the information is in a form that can be immediately passed on to the intended audience (e.g., electronic flyers)
    - Communicate through LinkedIn, which is the primary social media tool for this industry. Consider a having a LinkedIn consultant or LinkedIn coordinator or a social media partner to help spread the word.

# APPENDIX A- BASELINE INTERVIEW PROTOCOL

*As part of the evaluation of the DCO Tech project, we are interviewing regional stakeholders, including industry representatives and professionals, K-12 faculty and staff, and staff from NOVA. The purpose of these interviews is to better understand the role of industry and education in the engineering technology career pathways, and to yield information and ideas to improve these pathways moving forward. Interview findings will be analyzed in the aggregate form and not individually. While we may use quotes from your interview in our reporting, we will not do so in a way that identifies you as the source of the quote.*

*Are you comfortable proceeding with the interview?* ❑ Yes ❑ No
*If no, thank the participant for their time and end the interview.*
*If yes, ask the following:*

*To make sure I capture all of your valuable feedback, I would like to audio record your interview for my own notes.*
*Do I have your permission to record this interview?* ❑ Yes ❑ No.
*If no, assure the participant that you are not recording the interview, and only take notes by hand.*
*If yes, proceed with recording the interview.*

## INDUSTRY REPRESENTATIVE PROTOCOL

1) Can you describe your role and position? How are you connected to the advanced manufacturing industry, data center industry, and/or CTE education in your region?

### Defining the need

*The interview is divided into three parts. This first section helps us define the employment need for advanced manufacturing and/or data centers in your region.*

2) Please describe the employment need, if any, facing advanced manufacturing [Micron] and/or data centers in your region? How do you see your employment needs changing over the next five years, if at all?
3) Please describe the essential skills (e.g., soft skills or hard skills) you look for when you hire talent for your industry? What are the challenges or barriers to finding talent for your industry? How could this task be made easier (e.g., any resources or partnerships)?

### Engineering technology career pathways

*This next section focuses on the engineering technology career pathways, which includes the pathways for advanced manufacturing (engineering technology) and data center operations.*

4) Can you describe what you know about secondary and/or higher education efforts to create degree programs and pathways in advanced manufacturing [Micron] and/or data center operations?
5) What pathways do technicians typically take before they enter the advanced manufacturing and/or data center industry? What credentials do these technicians typically have? What types of training, if any, do you provide to these technicians on the job?
6) Broadly describe the demographics of the population of technicians at your organization [Probe: race/ethnicity, gender and age]. What strategies, if any, would help create a more diverse population of technicians?
7) In what ways, if at all, do you currently partner with other regional stakeholders involved in engineering technology career pathways [Probe on: engineering technology and data center operations career pathways; industry trade groups, employers, postsecondary institutions, K-12 institutions]? [If not at all] Are you aware of or in contact with any of these stakeholders?

### DCO Tech Project

*The DCO Tech project aims to improve the pipeline of students prepared to enter the workforce as technicians for engineering technology or data center operations through a summer bridge program, an internship preparation program, and externships for K-12 staff and industry professionals. The DCO Tech project also aims to increase collaboration between secondary, postsecondary and industry. This final section discusses partnerships with the DCO Tech project. Since this is a relatively new project, please feel free to only answer the questions you feel comfortable addressing.*

8) What do you see as your organization's role in the DCO Tech project?
9) Given your understanding of the goals of the project, how can industry contribute to the success of the DCO Tech project? How could you or your organization benefit from the DCO Tech project?
10) How can the DCO Tech project team foster industry partner involvement and engagement in the project? How can the DCO Tech project most effectively communicate with industry partners?

### Wrap Up

11) Is there anything else you'd like to share?

## K12 FACULTY/STAFF PROTOCOL

1) Can you describe your role and position? How are you connected to engineering technology career pathways (i.e., engineering technology and data center operations) in your region?

### Defining the need

*The interview is divided into three parts. This first section helps us define the need regarding awareness of careers and degree programs in engineering technology career pathways, which includes engineering technology and data center operations.*

2) Can you describe what you know about advanced manufacturing careers and degree programs for engineering technology, and the advanced manufacturing presence in northern Virginia (e.g., Micron)? What additional information or resources would help you better understand the types of careers available in advanced manufacturing and/or the pathways and required training for students?
3) Can you describe what you know about careers and degree programs in data center operations, and the data center presence in northern Virginia (e.g., largest data center market in the world, routes nearly 80% of internet traffic)? What additional information or resources would help you better understand the types of careers available in data center technology and/or the pathways and required training for students?
4) Based on your experience, please describe the level of student awareness of these careers and degree programs, and the advanced manufacturing and data center presence in northern Virginia? What strategies or approaches would you use to increase student awareness in these areas?
5) Based on your experience, please describe the level of student interest in other Information and Engineering Technology (IET) disciplines (e.g., IT, cloud computing, cybersecurity)? Do students show a similar level of interest in engineering technology and/or data center operations as compared to other IET disciplines? If not, why do you think this is the case?

### Engineering technology career pathways

*This next section focuses on the engineering technology career pathways, which includes the pathways for advanced manufacturing (engineering technology) or data center operations.*

6) Please describe the programs that your district or school offers that might be aligned with engineering technology career pathways. [Probe: any coursework, capstone projects, summer programs, etc.] What would be the most effective approach for a community college to establish a connection or pathway with these programs? [Probe: In your experience, what approaches work well? What approaches do not work well?]
7) How does your district support students who are pursuing technician career pathways (e.g., credentials with on-the-job training and not a 4-year pathway)? What regional opportunities do you see for students that do not require a credential from a 4-year institution?
8) Given your experience, what strategies would be most effective to attract underrepresented students to engineering technology career pathways?
9) In what ways, if at all, do you currently partner with other regional stakeholders involved in engineering technology career pathways or careers (Probe on: engineering technology and data center operations; industry trade groups, employers, postsecondary institutions, other K-12 institutions)? [If not at all] Are you aware of or in contact with any of these stakeholders?

### DCO Tech Project

*The DCO Tech project aims to improve the pipeline of students prepared to enter the workforce as technicians for engineering technology or data center operations through a summer bridge program, an internship preparation program, and externships for K-12 staff and industry professionals. The DCO Tech project also aims to increase collaboration between secondary, postsecondary and industry. This final section discusses your partnership with the DCO Tech project. Since this is a relatively new project, please feel free to only answer the questions you feel comfortable addressing.*

10) What do you see as your organization's role in the DCO Tech project?
11) Given your understanding of the goals of the project, how can K-12 faculty and staff contribute to the success of the DCO Tech project? How could you or your organization benefit from the DCO Tech project?
12) How can the DCO Tech project team foster K-12 partner involvement and engagement in the project? How can the DCO Tech project most effectively communicate with K-12 partners?

### Wrap Up

13) Is there anything else you'd like to share?